

wherein said crystalline semiconductor layer has a ridge less than 500Å on said surface of said semiconductor layer.

3. A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon over a substrate, said semiconductor layer comprising a source region, a drain region, and a channel formation region provided between said source region and said drain region;

an insulating layer comprising a thermal oxide of said semiconductor layer, said thermal oxide being provided in contact with a surface of said semiconductor layer and constituting a part of a gate insulating layer of said semiconductor device; and

a gate electrode provided adjacent to said channel formation region with said gate insulating layer therebetween,

wherein said crystalline semiconductor layer has a ridge less than 500Å on said surface of said semiconductor layer.

4. A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon over a substrate, said semiconductor layer comprising a source region, a drain region, and a channel formation region provided between said source region and said drain region with at least one lightly doped region between said channel formation region and at least one of said source region and said drain region;

an insulating layer comprising a thermal oxide of said semiconductor layer, said thermal oxide being provided in contact with a surface of said semiconductor layer and constituting a part of a gate insulating layer of said semiconductor device; and

a gate electrode provided adjacent to said channel formation region with said gate insulating layer therebetween,

wherein said crystalline semiconductor layer has a ridge less than 500Å on said surface of said semiconductor layer.

5. A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon on an insulating surface,

wherein said crystalline semiconductor layer has a ridge less than 500Å on a surface of said crystalline semiconductor layer.

6. The device of claim 5 wherein said ridge is formed by irradiating a laser light to said semiconductor layer.

7. The device of claim 6 wherein said laser light is KrF excimer laser light or XeCl excimer laser light.

8. The device of claim 5 further comprising:
a gate insulating layer provided on said crystalline semiconductor layer; and
a gate electrode provided on said gate insulating layer.

9. The device of claim 5 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

10. The device of claim 5 wherein said ridge is less than about 200Å.

11. A semiconductor device comprising:
a crystalline semiconductor layer comprising silicon on an insulating surface; and
an insulating layer comprising silicon oxide or silicon nitride provided on said crystalline semiconductor layer, said insulating layer constituting a part of a gate insulating layer of said semiconductor device,
wherein said crystalline semiconductor layer has a ridge less than 500Å on a surface of said crystalline semiconductor layer.

12. The device of claim 11 wherein said ridge is formed by irradiating a laser light to said semiconductor layer.

13. The device of claim 12 wherein said laser light is KrF excimer laser light or XeCl excimer laser light.

14. The device of claim 11 further comprising a gate electrode provided on said gate insulating layer.

15. The device of claim 11 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

16. The device of claim 11 wherein the silicon oxide of said insulating layer is formed by wet oxidation or hydrogen chloride oxidation.

17. The device of claim 11 wherein said ridge is less than about 200Å.

18. A semiconductor device comprising:
a crystalline semiconductor layer comprising silicon on an insulating surface,
wherein said crystalline semiconductor layer has a ridge less than 500Å measured by AFM on a surface of said crystalline semiconductor layer.

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19. The device of claim 18 wherein said ridge is formed by irradiating a laser light to said semiconductor layer.

20. The device of claim 19 wherein said laser light is KrF excimer laser light or XeCl excimer laser light.

21. The device of claim 18 further comprising:
a gate insulating layer provided on said crystalline semiconductor layer; and
a gate electrode provided on said gate insulating layer.

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22. The device of claim 18 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma or CVD or LPCVD.

23. The device of claim 18 wherein said ridge is less than about 200Å measured by AFM.

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24. A semiconductor device comprising:
a crystalline semiconductor layer comprising silicon on an insulating surface; and

an insulating layer comprising silicon oxide or silicon nitride provided on said crystalline semiconductor layer, said insulating layer constituting a part of a gate insulating layer of said semiconductor device,

wherein said crystalline semiconductor layer has a ridge less than 500Å measured by AFM on a surface of said crystalline layer.

Susy 25. The device of claim 24 wherein said ridge is formed by irradiating a laser light to said semiconductor layer.

D 26. The device of claim 25 wherein said laser light is KrF excimer laser light or XeCl excimer laser light.

Bh *Patent* 27. The device of claim 24 further comprising a gate electrode provided on said gate insulating layer.

28. The device of claim 24 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

29. The device of claim 24 wherein the silicon oxide of said insulating layer is formed by wet oxidation or hydrogen chloride oxidation.

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30. The device of claim 24 wherein said ridge is less than about 200Å measured by AFM.

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31. A semiconductor device comprising:
a crystalline semiconductor layer comprising silicon on an insulating surface; and

an insulating layer comprising silicon nitride provided on said crystalline semiconductor layer, said insulating layer constituting a part of a gate insulating layer of said semiconductor device,

wherein said crystalline semiconductor layer has a ridge less than 500Å on a surface of said crystalline semiconductor layer, and

wherein said semiconductor layer is irradiated with a laser light while said insulating layer comprising silicon nitride is provided on said semiconductor layer, in order to suppress formation of said ridge.

32. The device of claim 31 wherein said laser light is KrF excimer laser light or XeCl excimer laser light.

33. The device of claim 31 wherein said ridge is less than about 200Å.

34. The device of claim 31 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

35. A semiconductor device comprising:
a crystalline semiconductor layer comprising silicon on an insulating surface; and

an insulating layer comprising silicon oxide provided on said crystalline semiconductor layer, said insulating layer constituting a part of a gate insulating layer of said semiconductor device,

wherein said crystalline semiconductor layer has a ridge less than 500Å on a surface of said crystalline semiconductor layer, and

wherein said semiconductor layer is irradiated with a laser light while said insulating layer comprising silicon oxide is provided on said semiconductor layer, in order to suppress formation of said ridge.

36. The device of claim 35 wherein said laser light is KrF' excimer laser light or XeCl excimer laser light.

37. The device of claim 35 wherein said ridge is less than about 200Å.

38. The device of claim 35 wherein said crystalline semiconductor layer comprising silicon is formed by plasma CVD or LPCVD and crystallization conducted after said plasma CVD or LPCVD.

39. The device of claim 35 wherein the silicon oxide later is formed by wet oxidation or hydrogen chloride oxidation.

40. A semiconductor device comprising:

a crystalline semiconductor layer comprising silicon on an insulating surface; and

an insulating layer comprising silicon oxide or silicon nitride provided on said crystalline semiconductor layer, said insulating layer constituting a part of a gate insulating layer of said semiconductor device.

wherein said crystalline semiconductor layer has a ridge less than 500Å measured by AFM on a surface of said crystalline and semiconductor layer, and

wherein said semiconductor layer is irradiated with a laser light while said insulating layer is provided on said semiconductor layer, in order to suppress formation of said ridge.

41. The device of claim 40 wherein said laser light is KrF excimer laser light or XeCl excimer laser light.